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Sinclair Research Sells Out!

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Amstrad Purchase of Sinclair Research Is End of an Era in British Computers

By PAUL HEMP

Staff Reporter of THE WALL STREET JOURNAL
LONDON — Amstrad Consumer Electronics PLC bought the computer business of troubled Sinclair Research Ltd. for the equivalent of \$7.3 million.

The sale represents the end of an era in the British computer business. Founded by British entrepreneur Sir Clive Sinclair, Sinclair Research manufactured the first computer to sell in Britain for less than 100 pounds—currently the equivalent of \$145—and says it was the first company in the world to sell more than a million computers.

The sale was unexpected. A sales slump early in 1985 had pushed the once-success-



Sir Clive Sinclair

ful computer maker into the red, forced it to twice reschedule its overdue debt and prompted speculation among competitors that the company might be forced into receivership. But Sinclair said in February that it would begin selling a new model, the ZX 128, and that its financial problems had been re-

solved. Its computer business accounted for about 90% of its revenue last year.

Amstrad, a British microcomputer company, bought the Sinclair brand name and world-wide rights to sell and make Sinclair computer products.

Manufacturing Plans

Amstrad said it plans to begin manufacturing Sinclair computers when contracts with existing suppliers expire later this year.

Alan Sugar, Amstrad's chairman, said the Sinclair line of computers, less expensive machines designed mainly for home entertainment, would complement Amstrad's line of business-oriented home computers and word processors.

Mr. Sugar added that Sinclair products, which have been sold primarily in the United Kingdom and several other European countries, will benefit from Amstrad's world-wide distribution network. Sears, Roebuck & Co. of the U.S. in March agreed to market Amstrad's Personal Word Processor in the U.S. and Canada.

With the addition of Sinclair's computer business, Amstrad could expect sales of \$58 million and earnings of between \$7 million and \$12 million in the first year, said Richard Budgett, an analyst at W. Greenwell & Co..

Amstrad, which sold 750,000 computers world-wide in 1985 and expects to sell one million this year, says it holds about 20% of the U.K. home-computer market, based on units sold. Sinclair, which sold about 400,000 computers last year, holds about 40% of the home-computer market.

Sinclair Selling Stakes

Sinclair also said it will sell parts of its other businesses. It has sold a majority stake in its telecommunications-products business to parties it declined to identify. In addition, Barclays Bank PLC and other investors have taken a minority stake in the company's semiconductor unit.

When all transactions are complete, Sinclair Research "won't owe any money and will have some assets," Sir Clive said. The company rescheduled about \$22 million of debt last August, and had paid creditors about \$14.6 million before yesterday's transactions.

As for Sir Clive, he will essentially start over. A new company will be formed to do research for other companies, and Sir Clive and fellow researchers will work on developing new products in a variety of fields. "I always said I was an inventor," he said. "Once a product is developed, I want to get out."

Also Inside: Printers, Interfaces, Reviews, Programs, & News!

Letter from Editor

With all the changes that have been taking place over the past several weeks, it's going to be interesting to see what will happen next! The recent Amstrad deal with Sinclair will certainly be "the buzz" at the Midwest TS Computerfest the first of MAY.

I do hope to see a lot of you there at the show. It will be exciting! Trust me!

The introduction of the Timex (of Portugal) computer line in Mexico will certainly incite new furor in this hemisphere over our computers. Hopefully some of it will slip across the border and provide a new outlet of equipment and software for us.

Those of you who only have the ZX 81/TS 1000/1500, don't despair; May's issue will be devoted (almost) entirely to you! We have found several dealers who still have stock on some good software titles and hardware.. just for you! For one supplier, read the classified in this issue.

If you have some ideas you would like to share with us and other readers, send

them in! We would love to hear from you. We can't always answer your letter, but we do try.

If you have been waiting for the BEST OF SUM, we should be shipping them by the time you get this issue. We wish to apologize for the delay, but it was a much larger undertaking than we originally thought. It will contain the best information from previous issues back to our original TUG Newsletter which began in early 83. I will have some at the Show, so stop on by!

-- Joe Williamson



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Editorial on the Sinclair/Amstrad Deal



What a shock! Only days after coming out from under rigorous bank supervision, Clive Sinclair sells his computer company to Amstrad, his leading competition in the English home computing market. A larger scale version in the U.S. would be Commodore suddenly selling out to Atari!

However, my feelings about this move is far different than my feelings when Timex left the American computer market. Here's why. For some time it has been evident that Clive was casting his eyes toward other endeavors. Scientific wizard he might be, but financial genius he wasn't. Sinclair Research has been fighting off bankruptcy for several months, and was under the control of a team assembled by their leading creditors. Many in the computer business were fearful of what would happen when control reverted to Clive Sinclair on about April 1. Eccentric as he was, he might have announced new products, cut off support for old products, announced another electric car, no one knew. What has transpired is probably the best possible outcome for those of us who love our Timex/Sinclairs.

Who is Amstrad? The first time I heard of Amstrad was at last summer's Consumer Electronics Show in Chicago (see June 1985 SUM). At the show Amstrad was showing their CPC6128, a 128K CP/M based computer with one disk drive, monitor and word processor for about \$500! Amstrad first entered the English market as a manufacturer of high quality, low cost stereo equipment.

In June 1984 they introduced their first home computer. Since then they have risen to become the #2 home computer manufacturer in England behind Sinclair. Financially they seem to have built a solid cash reserve and realize good markups on their products by manufacturing

their machines themselves, different than Sinclair who always "farms out" their work. Further, they have gained the confidence of the British public at a time when many other English computer companies were having a hard time or even going out of business.

Amstrad computers are not known so much for their technical sophistication nor are they considered on the leading edge of new research, using the venerable Z80 chip and the CP/M disk operating system. But their strength is being able to take time-tested technology and packaging it in new ways and at extremely attractive prices. Their marketing savvy is a wonder to behold.

Sinclair on the other hand is just the opposite on almost every point discussed in the above two paragraphs. Sinclair made many technological firsts but financially failed to reap as he should have because of his lack of marketing ability.

I believe that this "merger" is going to be a boon to us. Amstrad has indicated that it will strongly push the Spectrum line. I can envision the QL possibly being sold outright to a group of investors who will start a new company devoted exclusively to marketing and expanding this great Sinclair computer. Meanwhile, some of the advanced research already nearing completion in the Sinclair Research labs will surely show up in new Amstrad products, leading Amstrad to leapfrog their competition. Possible new products rumored include a combination IBM PC and QL compatible machine, portable computers with the outstanding Sinclair flatscreen, and a Macintosh/Atari ST type computer with color monitor and disk drive for \$500! Now these are just rumors, but the two best companies in England to pull off such a feat have just become one, and no better chance exists than this to see such things come to pass.

Amstrad has already established a small presence in the American market, and has already entered an agreement with Sears to help import and distribute part of their current computer line.

-- Richard Cravy

Producing Sprites on the 2068

Back in September of '84, SUM published my program that showed how to print a pattern on the screen that was not a slave of the 8x8 pixel dimension, but it only worked vertically. At the time it seemed impossible to do the same thing horizontally without doing an endless character creation session. It was not worth it.

At first I tried to poke the characters in real time to move the pattern right or left but it took too long. In order to move the pattern right or left rapidly, it is necessary to do the POKEing ahead of time. Lines 3000 to 3100 do this by setting up eight different character sets for the eight horizontal positions of the pixel pattern in the 8X8 character grid. This works because when you halve a binary number the pattern is preserved and shifted right one pixel. If an odd number is halved, that is the ones position is filled, that pixel is shifted two characters to the right. This shift is done by adding 128 to that character after its value has been halved. The first screen dump shows the eight USR character sets.

Notice in the sets there are blank characters between every two filled characters because the sprite is two characters high. If the sprite were three CHR\$ high the pattern would be three CHR\$ and then the blank. To move vertically, USR graphics location is poked. This makes the pixels move vertically within each CHR\$ and from one character to the next. Characters next to each other in a character set are printed in a column on the screen.

The listing uses a non-standard character set for clarity. Where you see normal characters, that means that those are USR graphics characters. To move the saucer up or down, USR is changed by one. To move right and left, the start of USR characters is poked by 168 which shifts it one complete CHR\$ set. Every eight shifts, horizontal or vertical, the printing position is changed and the USR CHR\$ are reset to the start. Just for fun, by pressing either "L" or "R" an automatic movement takes place which can be stopped

with "S". The arrow keys move the saucer manually.

Sprites guzzle memory, but can make impressive animations. Try the following program and use it's fundamental ideas for your own program. When you RUN the program, press enter when the characters stop forming. Happy saucering!

John Monkus

```

10 REM SPRITES
20 REM BY JOHN MONKUS
30 REM 2-25-86
50 POKE 23675,X-256*INT (X/256)
): POKE 23676,INT (X/256): RETUR
N
990 BEEP .2,10
999 STOP
3000 REM MAKE CHR$ SETS
3010 LET X=65368: GO SUB 50: PRI
NT TAB 6;"ABCDEFGHIJKLMNQRSTU"
3020 FOR S=1 TO 7: LET A=65352-1
68*S
3030 FOR A=A TO A+15: DIM M(2,5)
: FOR I=1 TO 4: LET M=PEEK ((A+2
4*I)+168): LET M=M/2: IF M-INT M
<>0 THEN LET M(2,I+1)=128: LET M
=INT M
3040 LET M(1,I)=M+M(2,I): POKE A
+24*I,M(1,I): NEXT I: NEXT A
3050 LET X=65368-168*S: GO SUB 5
0: PRINT TAB 6;"ABCDEFGHIJKLMNQR
STU"
3060 NEXT S: PRINT TAB 6;"ABCDE
FHIJKLMNQRSTU"
3100 PAUSE 0
8000 REM MOVE SPRITE
8010 CLS : LET X=65368: GO SUB 5
0: LET SC=0
8020 PRINT AT 6,11; OVER 1;"BEH"
:AT 7,11;"CFI": LET C=6: LET T=1
4: LET V=0: LET H=4: GO TO 8090
8050 IF INKEY$="6" THEN LET V=V-
1: IF V=-6 THEN LET V=2: LET C=C
+1: IF C=20 THEN LET C=19: LET V
=-5
8060 IF INKEY$="5" THEN LET H=H-
1: IF H=-1 THEN LET H=6: LET T=T
-1: IF T=-1 THEN LET T=0: LET H=
0
8070 IF INKEY$="7" THEN LET V=V+
1: IF V=4 THEN LET V=-4: LET C=C
-1: IF C=-1 THEN LET C=0: LET V=
3
8080 IF INKEY$="8" THEN LET H=H+
1: IF H=8 THEN LET H=0: LET T=T+
1: IF T=29 THEN LET T=28: LET H=
7
8090 IF INKEY$="9" THEN GO TO 99
0
8100 IF INKEY$="5" THEN LET SC=0
8110 IF INKEY$="L" THEN LET SC=-
1
8120 IF INKEY$="R" THEN LET SC=1
8130 IF SC=-1 THEN LET H=H-1: IF
H=-1 THEN LET H=6: LET T=T-1: I
F T=-1 THEN LET T=0: LET SC=1: L
ET H=0
8140 IF SC=1 THEN LET H=H+1: IF
H=8 THEN LET H=0: LET T=T+1: IF
T=29 THEN LET T=28: LET SC=-1: L
ET H=7

```



```

8190 LET X=65368-168*H+V: POKE 2
3675,X-256*INT (X/256): POKE 236
76,INT (X/256)
8200 PRINT AT C,T;"BEHK";AT C+1,
T;"CFIL";AT C+2,T;"DGU
8210 PRINT AT 0,6;"ABCDEFGHIJKLM
NOPQRSTU";AT 1,5;"ABCDEFGHIJKLM
NOPQRSTU"
8220 GO TO 8030
8998 STOP
9000 REM USP-6123
9010 POKE 23658,8: RESTORE : LET
X=65368: GO SUB 50: FOR J=144 T
O 156: FOR I=0 TO 7: READ C: POK
E USR CHR$ J+I,C: NEXT I: NEXT J
9018 DATA 0,0,0,0,0,0,0,0
9020 DATA 0,0,0,0,3,3,15,63
9022 DATA 64,63,15,3,0,0,0,0
9026 DATA 0,0,0,0,0,0,0,0
9028 DATA 0,0,0,254,255,109,109,
255
9030 DATA 0,255,255,255,254,0,0,
0
9032 DATA 0,0,0,0,0,0,0,0
9034 DATA 0,0,0,0,128,128,224,24
8
9036 DATA 4,248,224,128,0,0,0,0
9038 DATA 0,0,0,0,0,0,0,0
9040 DATA 0,0,0,0,0,0,0,0
9042 DATA 0,0,0,0,0,0,0,0
9044 DATA 0,0,0,0,0,0,0,0
9100 GO TO 3000
9998 STOP
9999 SAVE "SPRITES" LINE 9000: V
ERIFY ""

```

```

Program: SPRITES
NOPQRSTU
ABCDEFGHIJKLMNOPQRSTU
ABCDEFGHIJKLMNOPQRSTU
NOPQRSTU
ABCDEFGHIJKLMNOPQRSTU

```

Kempston, Another Spectrum Disk Interface

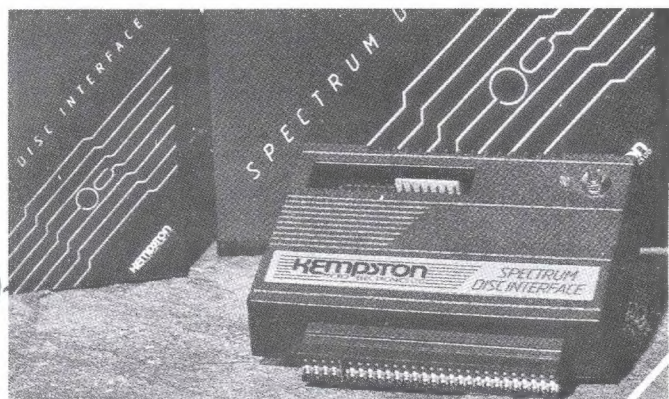
I have been using the Kempston disc drive interface on one of my TS 2068's since early October and I am extremely pleased with the results so far. The Kempston disc interface is intended for use on the Spectrum. In order to use it on a TS 2068, one needs to use a Spectrum BUS adaptor. I've been using the one made by Doug Dewey for use with the Spectrum Microdrives.

The disc interface is currently available in the US from English Micro Connec-

tion for \$119.95, or with a BUS adaptor to fit a TS 2068, \$129.95. I have found that the disc interface will not operate with an Emulator, and therefore a Spectrum ROM or ROMswitch is required for your TS 2068. With the disc interface attached, the TS 2068 hangs up in the 2068 mode if you try using an emulator.

The Kempston disc operating system, known as KDOS, is ROM based and eliminates the need to boot from a system disc. I'm told that when the disc interface is used on a Spectrum, the KDOS system message comes up when the Spectrum is turned on. When using a TS 2068, it is necessary to press the interface reset button after powering up before the KDOS system message will appear.

The interface is housed in a small black housing which is simply the standard Kempston joystick interface housing designed to match the styling of the Spectrum +. The interface is designed to lie flat, unlike the earlier Kempston interface box which was vertical in



design. The disadvantage of this is that when the disc interface is attached to the back of the Spectrum BUS adaptor board, it adds considerably to the depth of the TS 2068.

Also, the interface does not have a feed through connector. Therefore, something like a Currah u-slot or a Kempston three-way connector is required if you want to add a printer interface as well. I solved this problem by glueing an additional edge connector to the side of Doug Dewey's adaptor board and wired it up to the existing edge connector on the board. I've found the disc interface compatible with both Tasman and Kempston centronics interfaces. On top of the disc interface is a power on indicating LED and a reset button. The reset button is useful for clearing a program without the need to switch off the computer.

With the disc interface attached, the large heat sink on the Spectrum adaptor board gets very hot. However, I have run the system for several hours at a time with no problems and the TS 2068 power supply stays comfortably cool. I think there could be problems using Spectrum BUS adaptors other than Doug Dewey's EMU-4 which do not have such a large heat sink as his adaptor board does.

I am using the interface with a 5.25 inch single sided double density disc drive which gives me 200K of storage per disc. The Kempston interface is capable of supporting any standard single or double sided double density disc drives in 3, 3.5, or 5.25 inch sizes. I chose 5.25" discs rather than smaller sizes because of their low price and easy availability. 5.25 inch discs are advertised as low as 50 cents each, although this usually requires the purchase of 50 or 100 discs at a time. I was content with purchasing a box of 10 generic discs for \$14 at my local computer store. Also, 5.25 inch disc drives are easy to obtain and even brand new drives with case and power supply can be obtained for as little as \$125. My drive is half height and takes up very little table top space.

Up to four disc drives can be supported at one time. I borrowed a friend's disc drive and power supply which he pulled from his IBM XT. This second drive worked just as well as the one I purchased.

I like the KDOS operating system because disc commands are standard

Sinclair syntax preceded by a PRINT#4 command. Thus to load or save a file called 'TONY', you would use PRINT#4: LOAD "TONY" and PRINT#4 : SAVE "TONY". I find this syntax easier to use than that employed by the Sinclair Microdrives. If more than one disc drive is being used, the drive number must also be specified (if it is not specified, then the last drive accessed is assumed by default). In formatting discs, the drive number is always required. The command PRINT#4: CAT: PRINT 2 will CATalogue the contents of the disc on drive two.

Two utilities are provided to help transfer files from tape to disc. PRINT#4: COPY will copy files one at a time from tape to disc and if necessary, add headers to headerless files. This routine does not change the syntax of tape files and therefore this has to be done to make programs run on disc. The copy routine cannot handle recent Spectrum software with hyperloaders and problems arise with long programs and those with non-relocatable machine code in REM statements because the KDOS system takes up some system memory (about 800 bytes).

The other useful routine is PRINT#4: CLEAR 0 which replaces all numerical values in a BASIC program by VAL statements thus saving a few bytes each time. This is useful in fitting a BASIC program into the reduced memory space available.

All these instructions are adequately explained in a rather small size instruction book which I had to copy in an enlarged format in order to read easily with my eyesight.

I have found Interface III useful in transferring commercial software to disc. My technique is to make a tape copy of the software using Interface III. This results in a tape version with a simple two line loader. It is then only necessary to change the syntax of this basic loader to KDOS syntax and then about 50% of the time a working disc version results. I modified Tasword 2 basing my modification on a version for the Timex disc drives given by the L.I.S.T. user group.

Why did I choose the Kempston disc system for my TS 2068? There are several reasons and perhaps a better starting point is why choose a disc system at all? My reason came from my experience using Spectrum Microdrives. I have two TS 2068s

and using Microdrives on one of them soon put me completely off cassette tapes. I was completely won over by the ease and convenience of fast file finding and loading. I soon got tired of using tapes on my other TS 2068 (as did my children!) and decided to add a disc system to it.

Any disc system I purchased had to work on the TS 2068 in Spectrum mode since most of my software is Spectrum and I want to have access to the 5000+ items of Spectrum software compared with the less than 200 TS 2068 items, much of which is now outmoded. So since at the moment there are no disc systems switchable between Spectrum and 2068 modes, I had to go for a disc system designed for the Spectrum. Next it had to work on an adapted 2068. Not all disc systems designed for the Spectrum will do this. Finally, for reasons already discussed, I wanted to use 5.25 inch discs. These considerations led me to the Kempston disc interface and two further considerations confirmed that choice. First, price: I was able to put together my system for \$220 complete with a new disc drive. Secondly, future support of the system: Kempston seems to be one of the longer lasting and hopefully more stable suppliers of Spectrum hardware additions. These considerations of mine will not apply to everybody, but I do think the Kempston disc interface should be seriously considered by anyone who wants to add mass storage to their 2068.

Tony Brooks

Workin' in the Software Patch

Our feature program this month is OMNICALC 2, the impressive spreadsheet program from Microsphere, Ltd. OMNICALC 2 was reviewed in an earlier issue of SUM (volume II, Number 12).

In my opinion, OMNICALC 2 deserves every bit of praise it gets. Advanced capabilities and ease of use places OMNICALC 2 way ahead of any other spreadsheet at many times the price.

Out of the box, OMNICALC 2 works with the TS 2040 printer. It can be used with full-sized printers too, but being a British program, it was designed with British printer interfaces in mind.

What about those of us with AERCO, Oliger, or A & J printer interfaces? Can we configure OMNICALC 2 to use our full-sized printer? And better yet, can we somehow get full-sized printouts of the histograms that OMNICALC 2 can generate?

Happily, the answer is YES to both requests. By following the procedure below, you will be able to make this "workhorse" of a program work even harder!

You will need a copy of OMNICALC 2 (program: tom64000 in particular), and a copy of ZPRINT 80. ZPRINT 80 is the new printer support package from Zebra Systems, Inc.

I have a MEMOTECH DMX80 (Panasonic KX-P1090) printer and an AERCO printer interface. The Program can easily be modified for your particular needs.

First, type in the following "loader":

```
1 CLS: PRINT AT 0,10;"OMNICAL
C 2+";AT 1,4;"(C) 1984 Microspher
e Ltd.";AT 2,2;"(C) 1986
Mountaineer Software"
2 INK 7: LOAD ""CODE
3 POKE 64012,132: RANDOMIZE U
SR 64000: POKE 23728,1: LPRINT C
HR$ 15;: POKE 23728,0
4 LOAD ""
```

Line 3 sets the LPRINT width at 132, initializes the print driver, and sets the printer to condensed print. Next SAVE this to a blank tape with:

```
SAVE "omni2+"LINE 1
```

Once you save the loader, stop the tape and set it aside. Next, NEW the computer and LOAD ZPRINT 80. Select the high memory version (zprnt-hi), and follow the prompts to configure it to your printer/interface combination.

Save this driver on your tape following the loader. Finally, transfer "tom64000" to this new tape. This can be done either with a "tapecopy" program like TRANS-EXPRESS if you have a Spectrum emulator installed, or by going tape-to-tape. And that's it, OMNICALC 2+ is born!

A few comments on using this program:

--- Make sure that your printer is turned on when you LOAD "omni2+". Once the print driver is loaded, it will initialize the printer only if it is on.

--- With the condensed print, you can print up to 15 columns across on a normal 80 column printer.

--- To utilize the graphics capabilities, you need to set OMNICALC 2's graphic address. This is done with the 'X' command, followed by pressing 'G', and entering the number 64009 to the "address?" prompt.

- Remember that once you use the Graphics command to print out a histogram, the program resets itself to normal size print. To print in condensed print again, you will have to re-LOAD "omni2+". Hopefully the next revision will solve this small problem.

I want to publicly thank Karl Smith for all of the help and guidance he provided me with to make this "patch" possible. You can reach Karl at:

Karl Smith
40 White Ct.
Pataskala, OH 43062

I hope you find this "patch" helpful. If you come up with any more modifications for OMNICALC 2 (or any 2068/Spectrum program for that matter), drop me a line:

Bill Ferrebee
Mountaineer Software
749 Hill Str. #6
Parkersburg, WV 26104

NOTE: OMNICALC 2 (\$24.95) and ZPRINT 80 (\$19.95) are both available from:

E. Arthur Brown Company
3404 Pawnee Dr
Alexandria, MN 56308
(612) 762-8847

Until next time, take care!

-- Bill Ferrebee

Review: ZPrint 80 Universal Print Driver

Have you ever wanted to be able to modify a favorite program so that it would utilize your full-sized printer/interface combination to print out information? Or get a full 8 1/2 X 11 inch screen dump in color (sort of)? And do it in either 2068 or Spectrum mode?

Well, now thanks to Zebra Systems, you can accomplish all these...with ZPRINT 80.

ZPRINT 80 is a new "Universal Print Driver" software package that will modify itself to work with any of these popular Centronic printer interfaces available for the 2068: Aerco, Tasman, Oliger, A & J.

ZPRINT 80 will give you LLIST, LPRINT, and normal size COPY facilities on any parallel dot-matrix printer. Also, you can get a full-size grey scale "color" screen copy using any of the following printers:

Gemini 10X & SG10
Memotech DMX80
Panasonic 1090/1091
Epson FX/RX
Mannesman Tally Spirit-80
Prowriter 8510

Any picture you can generate on the screen can be copied, pixel for pixel, sideways on a full sheet of paper. ZPRINT 80 uses a grey scale, from white to black, to simulate a color picture. The procedure

takes about five minutes, and the results are amazing.

All of the other necessary features of a good print driver are also included. Print widths can be changed, linefeeds can be turned on or off, and print control codes can be added easily. This will allow you to use your printer's various print fonts.

ZPRINT 80 is provided in four versions: high memory (64000) and low memory (27000) for both the 2068 and Spectrum.

The only shortcoming I can see with ZPRINT 80 is the lack of relocatability. If ZPRINT 80 could be inserted at any memory location, like Jack Dohany's relocatable Aerco print driver, it would be the ultimate utility. (Maybe Jack could work on it???)

Overall, Zebra Systems has done it again! ZPRINT 80 is the print driver we have needed all along. I am indebted to them for taking the time to make using our T/S even more enjoyable.

-- Bill Ferrebee

The Heart of the Sinclair QL...the 68008

There is great confusion about the QL. The question is: in which computer category does the QL fall? The 32, the 16 or the 8-bit computer!?! It depends on the point of view. For now, we can say that the microprocessor, the MC68008, which is the heart of the QL, is an 8/32-bit type.

The microprocessor or the Central Processing Unit (CPU) is the nerve center of all activities in the computer system. It has generally 3 major tasks:

- 1-Control of operations
- 2-Interpretation of data
- 3-Execution of instruction

But a CPU alone is not very useful. The CPU needs memory and some peripherals to communicate with the outside world. The communication is possible via a computer BUS made up of multiple connectors which carry information to or from the CPU. A computer has generally three main bus types:

- 1-Address bus
- 2-Data bus
- 3-Control bus

Until now, most home computers were built around an 8-bit CPU. (8-bit CPUs are designed to work on 8-bit words at a time.) The two most popular of these were the Z80 (ZX81, TS2068, TANDY) and the 6502 (C64, ATARI). The 68008 of the QL is, like we previously called, an 8/32-bit because it has an 8-bit wide data bus and works internally on 32-bit words. On this point, the 68008 is similar to the INTEL 8088 (IBM PC) which is an 8/16-bit CPU because of its 8-bit data bus and 16-bit internal structure. Apple's Macintosh is a 16/32-bit with its MC68000.

MC68008 vs MC68000: THE HARDWARE SIDE

The MC68008 is the "economical version" of the MC68000. In fact, the MOTOROLA's 68000 series forms a real family. The 68000, itself, has a 16-bit wide data bus, the 68008 has an 8-bit one and the 68020 has the 32-bit wide data bus. The "advantage" of the 68008 over the other members of the family is, like we said, economical because the most commonly available low cost support chips are organised on an 8-bit basis. This means that these can be more easily designed

into a system around the MC68008. Also the necessary connectors are smaller on 8-bit data bus systems than on a 16-bit data bus systems.

The address bus has been reduced on the 68008 to 20 address lines (24 on the 68000) and 3 of the 68000's control signals are not directly present on the 68008. These omissions are justified by the fact that the 68000 is a 64-pin I.C. and the 68008 is a 48-pin I.C.. With 20 address lines, the QL can address directly 1MB of memory. There is no need here for a complicated BANK SWITCHING system like on the COMMODORE 128 and ATARI 130XE. On the QL, all the memory is accessible anytime. The 68000 has 2 pins not present on the 68008, UDS (upper data strobe) and LDS (low data strobe), but on the 68008 the pin DS (data strobe) does the same job. Also the VMA (Valid Memory Address) is not present, an external circuit is required here to simulate it.

MC68008 vs MC68000: THE SOFTWARE SIDE

The 68008 has the SAME instruction set as the other members of the 68000 family. With only 56 instruction types and the 14 different addressing modes, the programmer can access up to 1000 powerful instructions. These instructions can be from 1 to 5 words long, that is 2 to 10 bytes long. The 68008 (like the 68000) has 17 all-purpose 32-bit wide registers, one 16-bit FLAGS register and a 32-bit Program Counter. The 32-bit all-purpose registers means SPEED because complex operations can be carried out internally to the 68008 with the minimum need of data to or from memory. Each one of the all-purpose registers can be used like an Accumulator and we can do operations on 1 bit, 4 bits (DIGIT), 8 bits (BYTE), 16 bits (WORD) and 32 bits (LONG WORD).

In conclusion, if you love machine code programming then the Sinclair QL is certainly a good choice.

-- REAL GAGNON
544 Hermine #2
Quebec, Quebec
CANADA G1N 2G6

Editor's Note: Mr. Gagnon is the editor of SIN, "the only French North American Sinclair oriented magazine".

Reviewing Two TS-1000 Programs

DISTACALC

Basically Programming
2528 West Olive Avenue
Fullerton, CA 92633
16K TS/1000, 1500; \$12.95

Were you ever taught while in school that an airplane flying from the United States to the Soviet Union flies over the North Pole? The principle involved is that of the Great Circle route. The concept flies in the face of common perception. It is shorter to travel what appears to be a curved path instead of a "straight line" when traversing great distances across the globe.

Navigators must regularly utilize the great circle concept wherein both the distance between two points and the direction to take can be calculated. All (?) that is needed is a good knowledge of non-Euclidean geometry and spherical coordinate systems...or a computer with the right software.

DISTACALC is the right software if "close" is good enough. The program calculates distance and direction along a great circle route from one point on the earth to another. It also estimates your present location if you know the point from which you departed and the direction and distance you traveled.

I asked Distacalc the distance and direction from Memphis to Nashville and back. Both cities are stored in the Distacalc database. The database is a list of 107 worldwide cities whose latitude and longitude are filed within the program.

The results obtained were satisfactory. The distance was given in statute and nautical miles and in kilometers. In addition, the azimuth, the direction in degrees measured clockwise from north, told me which way to travel to get from one to the other. For the return trip the direction should have been 180 degrees different. It was in error by one degree.

If the two points involved are not among those listed, then you can add them to the database. The name, latitude, and longitude must be entered. The file holds up to 200 locations. Individual cities can be deleted, or a new file can be started.

The second option calculates your new

position if you know your former location (latitude and longitude) and the direction (azimuth) and distance (in nautical miles) you've traveled. The term for this type of calculation is "dead reckoning". I used the same two locations and the direction and distance of travel previously calculated to determine the accuracy of this option.

The results were very close but not in perfect agreement. The calculation of my new position should have been identical to the latitude and longitude for each destination city. Instead it was off by one to two minutes. A "minute" is 1/60 of a degree. This translates into 1-2 miles of error for the 180 mile trip.

In short the distances can be considered accurate calculations, while the directions are close estimations. The instruction booklet warns that this is the case. Use Distacalc to plan your vacations but not to aim your ICBMs. (Editor's Note: since nuclear warheads generally clear quite an area, it's probably close enough for them, too!)

-- Duncan Teague
3308 Bluemont Drive
Memphis, TN 38134

RAIDERS OF THE LOST TOMB

Ever wish you could visit Egypt with its tropical oases and trees, blowing desert sand, and ancient stone pyramids? In RAIDERS OF THE LOST TOMB, one can almost feel the burning sand sifting through your toes as one plays the game.

Your mission is to find four sacred stone tablets scattered throughout five levels of a long-forgotten Egyptian pyramid, and return safely to the first room where you entered.

Sound easy? Alas, as in most games, it is not. One must search 100 rooms (20 per level) and be on guard against bottomless pits, slithering snakes, ghoulish ghosts, and mummies that rasp in their tattered wrappings. However, one is armed with a limited number of knives which can be thrown at snakes and mummies to kill them.

Other helps on one's travels through the tomb are warning messages which warn

of possible impending doom up to one room away. Messages like "Ghosts nearby", "I hear snakes", "I feel a draft", and "I smell a mummy" warn of danger. Ladders are found to move up and down between levels, and, if you are lucky, one might find the rare blue ruby that has the power to instantly kill any wandering wrappings one might run into.

The game is made by Timeworks, which stopped making games for the

Timex/Sinclair computers in 1983. The programs put out by this company are excellent, and try to use all of the features of a computer. Now, this same company produces programs for the Commodore 64. RAIDERS OF THE LOST TOMB is now available from JPR Software, P. O. Box 4155, Winter Park, FL 32793; 305/273-1126. This program is for use on 16K ZX81s, TS1000s or unexpanded TS1500s. Cost is \$6.00.

Emergency Power for the 2068

You never notice how often the power goes off until you start fooling around with computers. A great majority of power interruptions go unnoticed in normal every day living. Unfortunately, that computer notices every one. The reaction is always the same. The screen goes blank and back come the opening copyright notice; gone is your program, data, document, or whatever.

With the Timex 2068 the solution to this problem is simple: a battery back-up to the regular wall outlet along with a charging system that keeps the battery fully charged.

Sound complicated? All you need are a few parts from your Radio Shack store and the battery. I happen to use two 6 volt 8.5 A.H. Gel-cell batteries in series (for 12 volts). These are really overkill. These just happened to be on hand and have run the computer for several hours when I forgot to turn the computer off.

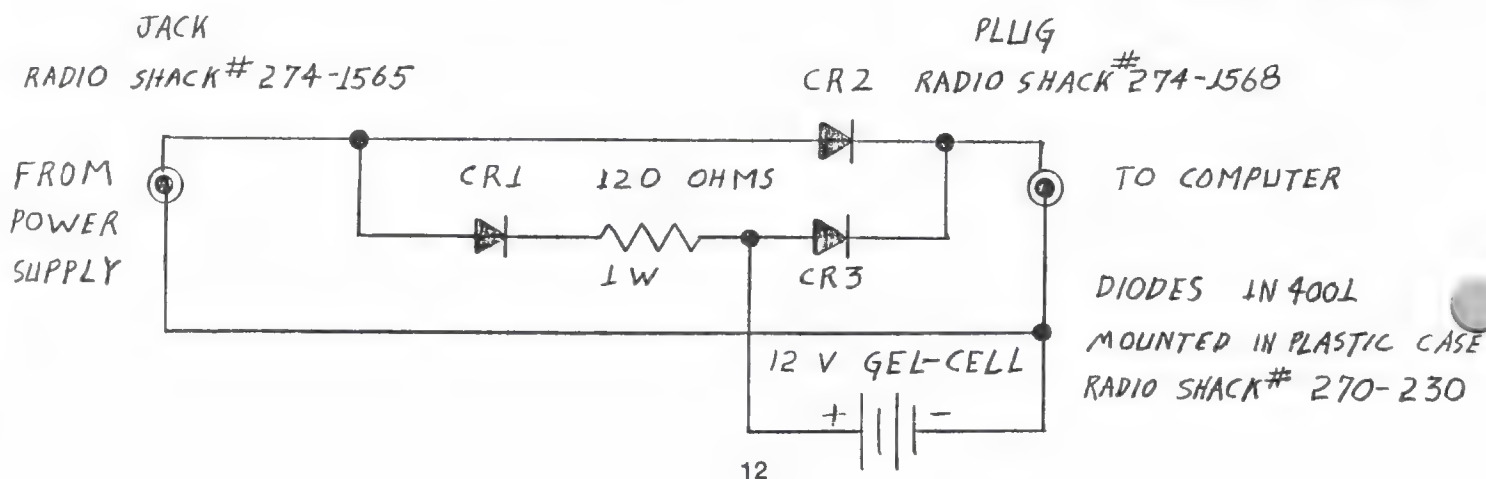
I used a Radio Shack plastic case and mounted the female power plug in one end, fed the wires for the male plug through a

hole cut in the opposite end, and ran the wires for the battery out the side. All other electronics are mounted in the box. Wiring is as shown in the schematic diagram.

In normal operation, power is supplied from the 2068 power supply, through CR2 to the computer. If the power goes off for any reason, the battery continues to supply power to the computer through CR3. Diode CR1 keeps the battery from discharging through the 2068 power supply and provides power through the 120 ohm resistor to keep the battery charged. This resistor will normally run warm. The one watt size was chosen to act as a fuse in case the battery shorts or puts too much load on the 2068 power supply. Better to replace a resistor than the power supply.

Note: This circuit is intended to keep the battery charged and not to recharge a totally dead battery. To attempt to do the latter may destroy the resistor.

-- Thornton Benson
H.C.R. Box 4245
Benson, AZ 85602



Reviewing Two Printers

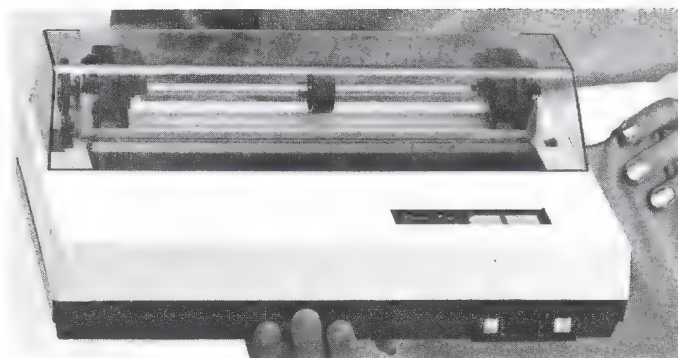
One of the first peripherals that most Timex/Sinclair owners purchase for their computers is a printer. Because the TS2068 as well as the older TS1000 and ZX81 did not come with a printer interface built-in, The Timex 2040 printer was an especially attractive purchase since it required no other interface, and fully supported LPRINT, LLIST, and COPY on both series of computers. Its disadvantages were the use of thermal roll paper and only 32 characters per line.

To allow users to go beyond the TS2040, various suppliers have introduced centronics parallel interfaces either as stand alone units or as part of another piece of hardware, such as a disk drive or microdrive interface. Current popular interfaces for the 2068 include the Tasman, Aerco, A & J, and Wafadrive.

Here at SUM we use, or have used, a variety of full size printers with our T/S machines. As the prices of printers continue to drop, it becomes more and more practical (financially) for users to add one or another of the printers available. Here are a pair that we have some experience with, and are sometimes advertised in the pages of SUM.

BROTHER DM-5 DOT MATRIX PRINTER. This little printer is a marvel. It has one of the smallest "footprints" of any fullpage printer I've seen. It is about 13" wide by 7" deep and less than 3" tall. Compare this to a Gemini 10X at 13" by 12" by 6", typical for Epson type printers. This means that the DM-5 is almost portable; I say almost since it is not battery powered (though a battery powered version does exist). However, small size does not mean lack of quality.

SUM obtained our DM-5 from Foote Software for about \$150. The printer has BOTH a parallel and a serial port, selectable by a set of dip switches. It comes standard with a typewriter style friction paper feed though a snap-on tractor feed is available as an option (adding the tractor increases the height). The ribbon is in an easy-to-install snap-in cartridge rated at about 1/2 million characters. Speed in normal pica (10 cpi) is rated at 50 characters per



second. In addition to pica, the DM-5 can print double-sized, condensed, underlined, bold, and super and subscripts. Using standard Epson software commands the DM-5 runs happily with Tasword II, Quill, OCP Word Manager, and BASIC.

I enjoyed very much the friction feed. It is one of the easiest I have ever used on a dot matrix printer, perhaps because friction feed is an afterthought on most printers of this kind, but standard on the DM-5. Standard 9 1/2" tractor feed or 8 1/2" letter size paper feeds happily through with little shifting from top to bottom.

The Brother DM-5 belongs to the same family as the Brother M-1009, M-1109, and Centronics GLP. Consequently, ribbons should be commonly available at office supply stores and others which stock computer supplies and printer ribbons.

Certainly if you must travel with your computer, or have a very limited desktop, or must constantly be putting away your computer to make room for other things, the DM-5 is an excellent choice.

SINCLAIR QL PRINTER. The printer which many purchase when they obtain their QL, the QL Printer is a serial interface, all black dot matrix printer with a very nice NLQ (near letter quality) printout in addition to its standard dot matrix output. In NLQ the print head goes over each line twice, the second time filling in the spaces between the dots which make up each letter.

Like the Brother DM-5 above, the QL Printer basically acts like an Epson so it runs well with most software. As the QL computer comes standard with an RS-232 interface, the printer can be used

immediately without having to worry about dip switch settings, interfaces, etc. T/S users with a Sinclair Interface I may also use the QL printer with suitable cable. I have heard of some who have connected it to the RS-232 port available on the back of the Zebra disk drive interface, though I don't know if they have gotten Tasword II to output to that port yet. (Perhaps some of our readers can share their experiences with that particular serial port.)

More traditionally sized, the QL Printer is rated at 100 cps in standard print mode, and 20 cps in NLQ mode. A pleasant surprise is the addition of an italic font to the standard fonts as listed with the DM-5 above. Opening the printer case reveals a tightly packed package with Seikosha SP80 plainly imprinted on the circuit board. This reveals what simple observation confirms--the Radio Shack DMP-130 is basically the same computer though the Radio Shack is a different color and includes a parallel interface. Therefore, additional ribbons are as near as your local Radio Shack Computer Center.

```
sinclair self-test
! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C
! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D
" # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E
sinclair self-test
> * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L
* + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M
+ , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N
```

SUM readers who wish to see what the NLQ looks like are referred back to December 1985 SUM in which most of the first 17 pages of that issue were all done on the Sinclair QL Printer. We purchased our printer from the English Micro Connection though most QL dealers should be able to supply the same printer for \$300-350.

Loading the QL Printer is a little difficult when using the tractor feed, but it feeds fine once loaded. The friction feed also is a little tricky. A feed table on the back of the printer helps line up single sheets. A special lever on the right side of the computer will automatically advance a single sheet of paper into the printer so that the printhead is positioned about 1" down the page for beginning printing.

We hope to review additional printers in future issues of SUM, including a 20 cps daisy wheel printer and the Panasonic 1080, each of which sell for \$250-300 and provide excellent value.

— Vendor Report —

The article last month on connecting the 2068 to a plotter has elicited a great response from a number of readers. Peripherals Direct was listed as the source for the Amdek plotter. They now inform us that they are sold out of this model but still sell Amdisk III 3" disk drives (similar to Zebra's disk system). Their address is P. O. Box 4301, Northbrook, IL 60065; 312/498-9244.

However, SUM MAGAZINE has not let you down. We have discovered that LOLIR in Dallas, Texas has a 3 pen color plotter at a great price. The Sweet P plotter is being sold by them for \$124.95 plus \$8.00 for all technical documentation and \$3.50 shipping. But if you tell them that you learned about them in SUM MAGAZINE, the price is \$109.95 (documentation & shipping still the same)! The man to speak to there is "Jerry". Lolir, 13933 N. Central #212, Dallas, TX 75243; 214/234-8032. They do accept Visa and Mastercard. That savings alone is worth a one year sub to SUM!

VARIETY SALES/WORD SOFTWARE has a new address and phone number as well as a brand new catalog of TS2068 and QL items. Right now they are featuring the new Tech Draw Jr. (jystick version) for \$22 postpaid. Tech Draw was reviewed in SUM back in August and reminded us of the Macintosh MacPaint program. Variety Sales, 325 W. Jersey St. #2D, Elizabeth, NJ 07027; 201/289-5699.

THE FD-68 USER is a newsletter being produced especially for owners and users of TS2068 Aerco disk drive systems. Issue I features information on utilizing bank switching, and modifying Artworx and Pro/File 2068 so they will run on the Aerco system. Four issues per year are planned; no subscription price is listed. FD-68 User, David Hill, 1159 South Shore Drive #12, Holland, MI 49423; 616/335-8726 after 5:00 p.m.

Recently we received G.U.T.S. (Grupo Usuarios T/S), a users group newsletter out of Mexico (and all in Spanish). They report that Timex is just now introducing the TS1500 there along with the TS2048, TS2080, and 3" disk drives with CP/M. The 2048 is what we would call the "Portuguese Timex" computer which briefly appeared here last summer. It is Spectrum compatible with Kempston compatible joystick ports. The 2048 looks like an American TS2068 painted black and shortened on the right side since the cartridge port has been eliminated. The 2080 is apparently the same as the Sinclair QL Printer being sold here in the States. The 1500 is also black. Anyone interested in more information or a subscription can write GUTS de Mexico, Tlaloc #21, Col. Tlaxpana, CpP. 11370, Mexico, D.F. Everett Talavera is the editor.

The QL market continues to expand. We've seen the new QL hardware and software catalog from ENGLISH MICRO CONNECTION and are really impressed with the serious software, disk drives, and even games that are now available. One very promising business package seems to be the Integrated Accounting software which would allow business bookkeeping on the QL. Something like that along with 512K of memory and dual disk drives would make an awesome accounting package for the price. English Micro Connection, 15 Kilburn Court, Newport, RI 02840; 401/849-3805.

-- Richard Cravy

Mind your own business... on a Sinclair QL!

Announcing **INTEGRATED ACCOUNTS**, the first serious business accounting package for the Sinclair QL. Designed for the small business person unfamiliar with computers but wanting or needing to computerize his bookkeeping and accounting functions, this package possesses many of the functions and capabilities of software normally found on much larger computer systems. Sales, Purchases, and Nominal Ledgers right through to Profit and Loss and Balance Sheets. Power and ease of use have been combined to provide a truly superior accounting package for your QL.

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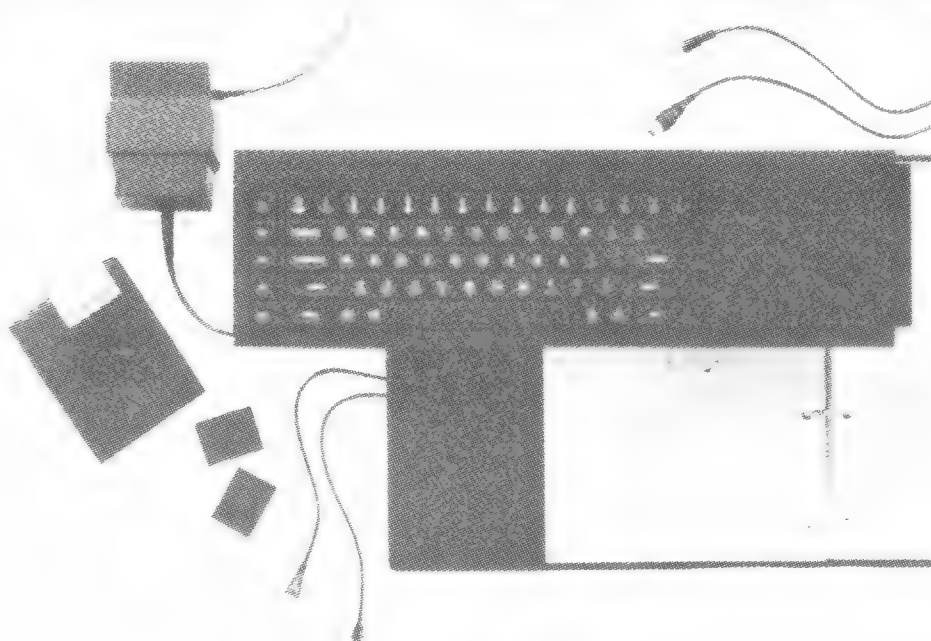
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While other computer companies talk about bringing the power of computing within reach of ordinary people someday soon, the Sinclair QL puts extraordinary power into their grasp, today. The power of the 32-bit architecture of the Motorola 68008 microprocessor. Of 128K RAM, expandable to 640K. Of two built-in Sinclair Microdrives for mass storage. Of networking. Of a full-size QWERTY keyboard. And of an operating system that accommodates windows and even multi-tasking.

The QL delivers up to 512 x 256-pixel full-color resolution or black-and-white display. It can be used with either a monitor or an ordinary TV. It has two RS-232C serial interfaces and accepts joystick cursor control

Included with the QL are four sophisticated, powerful and easy-to-use programs. A word processing program with the power and simplicity of dedicated word processing, that lets you print exactly what you see on the screen. A database management program with up to 256 data fields, in which you can

define relationships, extract data and reorganize it, do statistical and accounting calculations, and more. A spreadsheet program so simple to use you can do a complete "what-if" calculation in a single keystroke. And a graphics program with 32-bit speed to create spectacular and immediate effects for home or business.

The price for all this power? That may be the QL's most powerful feature of all.

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* THRUST *

Finally, real graphics power for your TS 1000! THRUST, the last word in cursor-controlled hi-res graphics for screen or printer output, is a software package composed of SincArtist HR and SincArtist 1.3. Examine this sample for an idea of the powerful versatility of THRUST.

SINCARTIST 1.3 - The original! Fantastic hi-res graphics delivered to the 2040 printer. SincArtist 1.3 boasts excellent user-group reviews and is simply the best non-hardware system available. Note these features:

- 192 X 256 high-resolution file displayed in a 48 X 64 screen window
- Circles, triangles, rectangles, quadrilaterals, rays, inversing, and more
- 40 redefinable patterns and a variety of draw and fill modes
- Cursor or joystick control
- No system modifications required

SINCARTIST HR - The last word in cursor-controlled high-resolution screen graphics. Copy artwork to the 2040 printer and save to tape. SincArtist HR requires a TS 1000 with a socketed 2K RAM, less than \$10.00 in parts, and a few minutes with a soldering iron. Super user-friendly documentation and instructions included. All modifications are fully transparent to other peripherals. HUNTER BOARD OWNERS: All you need is the FREE hardware upgrade that we provide!!!!

THRUST includes SincArtist HR and Sinc-Artist 1.3 (these programs are not sold separately). The Ultimate Hi-Res Tape is available exclusively from Weymil Corporation for only \$20.

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Now at last...

The FootePrint Printer Interface

The FootePrint Printer Interface was originally described in the January-March 1985 issues of SUM Magazine. Now improved and professionally built, it is available direct from the designer! FootePrint plugs into the cartridge slot of the TS-2068 and works with **both** Tasman (B and C) and Aerco print driver software. Just load the software and print. No POKES required. No modifications.

- for Centronics parallel printers
- works in both 2068 and Spectrum mode
- compatible with OS-64 & Spectrum emulators
- EPROM socket and on/off switch on board
- requires no modifications to computer
- plugs into cartridge dock—door completely closes with cable running back under computer
- frees up rear edge connector allowing other peripherals to be used; less chance of a crash
- print driver software for LPRINT, LLIST, and COPY included for 2068 and Spectrum modes

FootePrint Interface w/software & cable	\$45 ⁰⁰ postpaid
FootePrint with OS-64 option included	\$65 ⁰⁰ postpaid
Bare board & instructions only	\$15 ⁰⁰ postpaid
Cable only for use with bare board	\$15 ⁰⁰ postpaid

All prices are pre-paid and include shipping charges. Florida residents must add 5% state sales tax.

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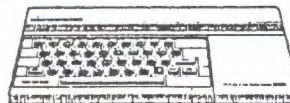
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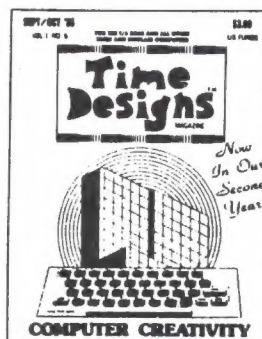
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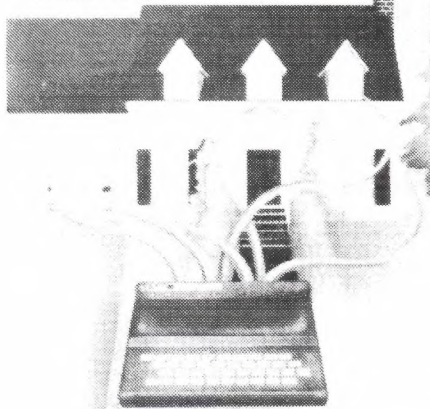
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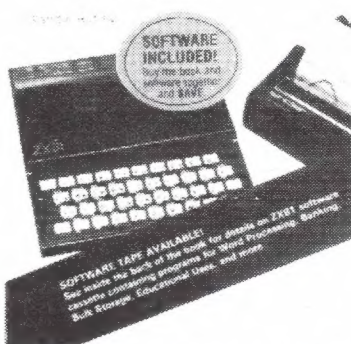
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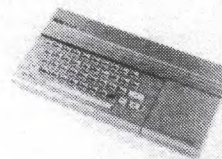
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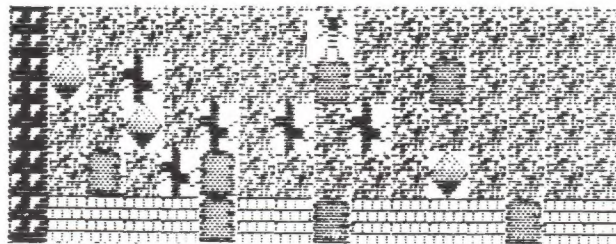
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